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THE CHEMISTRY OF THE COAL-TAR COLOURS

The Chemistry of the Coal-Tar Colours. Translated from the German of Dr. R. Benedikt, and Edited, with Additions, by E. Knecht, Ph.D. (London: George Bell and Sons, 1886.)

THIS is an excellent little practical manual dealing with a subject of great scientific and industrial importance—a subject the scientific side of which has been somewhat neglected in this country, to the inevitable detriment of the industrial side. The decline of this industry in England is a tempting subject to expatiate on; but the moral has of late been pointed with such laudable iteration that we refrain from pointing it afresh. The state of affairs which prevails with regard to the literature of the subject is expressed in the opening words of the editor's preface:—

"Although England may be called the birthplace of the coal-tar-colour industry, it is a remarkable fact that the English literature on the subject is very scanty, and that which does exist is now almost obsolete owing to the rapid strides which have been made during the last ten years in the manufacture of the coal-tar colours."

There is no doubt about the want, and we think that this little work supplies it to the extent aimed at. Both author and editor are specially qualified for their task by experience in teaching the technology of the subject.

The work contains excellent introductory chapters on the optical properties of colouring matters, the methods of testing colouring matters—both spectroscopically and with regard to their tinctorial power—on the relation of the various fibres to the colouring matters, and kindred general questions, of importance both to the colour chemist and to the dyer. "Rule-of-thumb" is everywhere excluded; reasons are fully and clearly given.

The greater part of the work is necessarily devoted to the chemistry proper of the coal-tar colours—the chemical processes by which the various colouring matters are obtained and the reactions by means of which a knowledge of their chemical constitution is arrived at. Constitutional formulæ naturally play a very important part.

Our modern dynamical chemists—some of whom, by the way, appear to be censors first and investigators afterwards—are never tired of crying out for the abandonment of these constitutional formulæ on the ground that they afford only statical, not dynamical, representations of chemical phenomena. Happily, those who have built up the German coal-tar-colour industry of the last fifteen years on the basis of the benzene theory have never shared this opinion; nor is it shared by our authors, who in their little treatise faithfully reflect the methods and results of this great scientific and industrial development. Doubtless, colour chemists would prefer a dynamical formula—one which should indicate, for example, the most suitable temperature at which to perform a potash fusion, or a nitration, with a few hints thrown in as to time of heating, concentration, and so forth—and doubtless the dynamical chemists will in time supply this want;

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but meanwhile the colour chemist feels, taught by experience, that his humble and inexact calculus of chemical operations, the constitutional formula, is vastly better than anything that has been offered in its stead. But as yet the dynamical critic does not appear to have anything to offer in its stead: like certain *dynamical* critics he is satisfied with destruction, and his attitude towards constitutional formulæ is not unlike that of the dynamical critic towards Constitutions—British and other.

There is little which calls for criticism in the chemical portion of the work: the classification is good, and the results of the elaborate investigations of which almost every colouring matter of any importance has of late years been made the subject are given briefly but in a way calculated to make clear to the beginner the significance of such work. We could have wished, however, that Dr. Knecht in his editorial capacity had thought good to give some account of the researches of O. Fischer on flavaniline and chrysaniline, and of Bernthsen on methylene-blue. The problem of the constitution of these compounds has been solved in a very instructive and conclusive fashion—much more conclusively than in the case of some of the colouring matters of which the constitution is discussed in the present work.

In the introduction reference is made to the popular prejudice which exists against the so-called "aniline dyes"—the collective name by which coal-tar colours are known among non-chemists. There is an impression that the tints are crude and glaring, and that the colours lack fastness. Certainly there are coal-tar colours which sin in all these respects. But there is a survival of the fittest here as elsewhere: the vulgar shades and fugitive colours are being weeded out and replaced by better. The accusations come most frequently from persons of an æsthetic turn, and it is perhaps too much to expect that the strenuous æsthete, living laborious days in the endeavour to improve his own taste and that of his neighbours, should be aware that the beautiful and permanent Turkey-red, which he so justly admires, is now a coal-tar colour, and that even indigo may be made from coal-tar. As regards "fastness" of colours, the ideas of the general public on the subject may perhaps be gauged by a speech which we remember reading, made some years ago by a Member of Parliament in distributing the prizes at a technical school. Seeking to inculcate the duty of thoroughness in work, and desirous at the same time to employ only such illustrations as would at once come home to every technologist, he said:—"But it would not be thorough work, for example, to daub a wall with untempered mortar, or to dye with fast colours." Probably a life divided between politics and sport had not permitted him to realise that the fastness of colours is distinct from that of race-horses—or of youth!

Where there is so much to praise we regret to have to record a defect, but we think that hardly adequate care has been bestowed upon the proof-reading. The misprints are unnecessarily numerous, and must sometimes be very puzzling to a beginner, especially where, as is occasionally the case, they affect complicated formulæ. A list of errata is given, which, however, needs extension. Whether, for example, the chemistry of the average student of technology will be equal to the task of informing him that not sodium bisulphate

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but sodium bisulphite is employed in the preparation of soluble alizarin-blue, or that the three formulæ given on p. 70 in a preliminary account of the products from tar, and described as those of "the three isomeric di-nitrobenzenes," are in reality those of the three mono-nitrotoluenes—errata not corrected in the list—is open to doubt.

In conclusion, we cordially recommend the book. We trust that it will not only be made use of by students of technology as a useful introduction to the larger treatises in French and German, but that the ordinary student of organic chemistry will take the opportunity of making a closer acquaintance with a special branch of his subject, as fascinating from a scientific point of view as it is fertile in practical results.

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JAPANESE HOMES

Japanese Homes and their Surroundings. By Edward S. Morse, Director of the Peabody Academy of Science. (London: Sampson Low, 1886).

ALTHOUGH Prof. Morse's connection with Japan has been comparatively short and interrupted, few men have done so much for scientific progress in that country. About ten years ago he first visited Japan in order to study certain forms of ocean life on its coasts, and, fortunately, was induced to accept the Chair of Zoology in the University of Tokio. While holding this office he did much to arouse an interest in the minds of his students for biological research, and he established a Biological Society, which is, we believe, still at work. By his discovery and thorough investigation of the shell-mounds at Omori, near Tokio, he stimulated prehistoric studies. His monograph on these mounds—although perhaps his theory as to the builders may not, on more extended examination, have proved tenable—was followed by a number of publications on the Japanese Stone Age, cave-dwellers, and the like; and in many less generally known directions his influence on the advance of science in Japan has been a beneficial and stimulating one. His first visit to Japan has been followed by two others, during which he visited all parts of the country, as well as other regions of Eastern Asia, and has collected material on a variety of matters. The present volume is a monograph on the house in Japan;—the different types of houses, their mode of construction, the uses of each part, the varieties in each from the roof to the foundation, the types and uses of household utensils, &c. The illustrations, which are beautiful, are also very numerous, being, on the average, about one to a page. Without them it would, indeed, be difficult for readers who are not well acquainted with Japanese houses to follow the descriptions. Many of these details Prof. Morse thinks it may soon be difficult, if not impossible, to obtain, and therefore like an old Japanese to whom he refers, and who "held it a solemn duty to learn any art or accomplishment that might be going out of the world, and then to describe it so fully that it might be preserved to posterity," he now describes and copies them for the benefit of future generations who may not have the opportunity of seeing these evidences of Japanese skill and sense of beauty. We do not

apprehend that the Japanese will ever change so far as to substitute the jerry-builder for their own carpenters, and we do not think that their style of architecture will ever greatly alter, for the simple reason that they have now what, on the whole, is the fittest. Nevertheless we cannot but be grateful to Prof. Morse for making the Japanese house, inside and out, so familiar to English readers. His work is so clear and detailed that we see no reason why any one who feels so disposed should not be able to erect for himself a home in the Japanese style in England.

In the eighth chapter indications from the most ancient works in Japanese literature are collected together in order to catch a glimpse of what the Japanese house of a thousand years ago was like. It would be useless without a plan of the modern house before us, to refer to these beyond quoting Prof. Morse's conclusion that they are significant indications of the marked southern affinities of the Japanese, and he thinks that, from all we can gather relating to the ancient house of the Japanese, it would seem that certain important resemblances must be sought for in Annam, Cochin China, and particularly in the Malay peninsula—but not amongst the Ainos. This is another nail in the coffin of the theory of an ethnic relationship of the latter with the Japanese. On the whole, Prof. Morse's theory of the history of house development in Japan is a slow but steady progress from the rude hut of the past to the curious and artistic house of to-day—a house as thoroughly a product of Japan as that of the Chinese, Corean, or Malay a product of these peoples, and differing from all quite as much as they differ from one another. It has just those features incorporated into it that might be expected from its physical proximity to, and historical relations with, China and Corea. The last chapter deals with the "neighbouring house"—that is, Corean, Chinese, Aino, and Loochooan houses. In this chapter the writer has fallen into a curious error in describing Hachijō Island as one of the Bonins. There is no more connection between the two than there is between Iceland and the Isle of Wight. Hachijō has from the earliest times been Japanese; it was at one time a place of exile for political offenders. The Bonins never belonged to Japan until within the last few years; as the name (*Bu* or *Mu Nin*, without people) implied, they were uninhabited, except by a few waifs and strays thrown up by the sea—Caroline Islanders, deserters from whalers and ships of war. The account of the visit to Hachijō, from which Prof. Morse quotes, was published some years ago in the *Transactions* of the Asiatic Society of Japan, and is of exceptional interest, for in this island may still be observed ancient Japanese customs which have long fallen into desuetude on the mainland. Thus the peculiar lustration ceremonies, the special parturition houses, &c., now found in Hachijō, are mentioned in ancient Japanese works as common to all Japanese. The difficulty of access to the island from the adjacent mainland on account of dangerous currents would explain the presence of this little oasis of antiquity. There is this excuse, however, for Prof. Morse's confusion of the Bonin Islands with Hachijō, that the expedition set out for the Bonins, but the writers about Hachijō went no farther than that island, and there, while awaiting the return of the steamer, collected the material for the paper in question.